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October 24, 2000

Byron Parker, Project Director
Legacy/I-15 North
UDOT
3995 South 700 East, Suite 100
Salt Lake City, Utah 84107-2594

SUBJECT: Legacy Parkway FEIS
State Identification Number: UT980925-140

Dear Mr. Dalton:

The Resource Development Coordinating Committee (RDCC) has reviewed this proposal. Comments from State agencies are as follows:

Division of Wildlife Resources

The Utah Division of Wildlife Resources (UDWR) has reviewed the Final Environmental Impact Statement (EIS) and Section 404 Permit Application for the Legacy Parkway. The project, to be situated in northern Utah between I-15 and the Great Salt Lake, is proposed to be a four lane, limited access, divided highway extending from I-215 at 2100 North northward to I-15 and U.S. Highway 89 near Farmington. A multiple-use trail for pedestrians, bicyclists, and equestrians is proposed to parallel the highway. In addition to a no-build alternative, the Final EIS evaluates four build alternatives: Alternatives A, B, and C, and a Preferred Alternative.

This review focused primarily on impacts to wetlands and wildlife from the Preferred Alternative (PA), since that is the subject of the Section 404 permit application. The PA is a combination of portions of Alternatives A and C, and was developed after the release of the Draft EIS. Much of the PA lies east of the Locally Preferred Alignment (LPA) presented in the Draft EIS, and would have fewer direct and indirect impacts to wetlands than the LPA. The PA would directly impact 114 acres of wetlands, compared to the 159 acres that would have been directly impacted by the LPA. However, the PA is not the least damaging of the build alternatives. Alternative A would have fewer direct and indirect impacts.

The proposed mitigation for wetland and wildlife impacts is the 1,251-acre Legacy Nature Preserve and 317 acres of additional mitigation between Farmington Bay Waterfowl Management Area (FBWMA) and the PA. The mitigation consists of preservation and enhancement of existing wetlands, and thus the project will result in a net loss of 114 acres of wetlands. Ownership of the 317-acre parcel would be transferred to the Utah Department of Natural Resources to be managed as part of FBWMA. Significant progress has been made in reducing impacts to wetlands and wildlife by shifting the preferred alignment to a more easterly location, and UDOT is recognizing the existence of indirect impacts to wildlife and proposing additional mitigation as compensation.

The Final EIS still contains significant shortcomings in its analysis of impacts to wetlands and wildlife. The hydrogeomorphic (HGM) models that were developed to analyze wetland impacts are seriously flawed and explicitly exclude most wildlife species. In April of 1997 DWR recommended that UDOT use the Habitat Evaluation Procedure (HEP) approach to assess impacts to wildlife. Neither HEP nor any other type of formal analysis of wildlife impacts was conducted for the Final EIS. Given the shortcomings of the analysis in the Final EIS, it is unclear whether the proposed mitigation adequately compensates for impacts to wetlands and wildlife. If a decision as to the adequacy of mitigation is to be based on formal analysis of impacts and mitigation, then the HGM model needs to be revised or some other method for wetlands assessment utilized, and a HEP analysis should be conducted for wildlife. The alternative is to use best professional judgement to assess the adequacy of mitigation, which would involve considering factors such as the uniqueness and temporal dynamics of the Great Salt Lake ecosystem, its international importance to wildlife, development threats, and the importance of creating a buffer zone west of the highway. If this latter alternative is pursued, then the decision-making process should be a public process involving the resource agencies and affected interests.

Comments are grouped into the major topic areas of analysis, mitigation, and monitoring. Relevant comments on specific sections of the Final EIS are included within discussion of these major topic areas. Comments are focused on the Preferred Alternative (PA) since that is the alternative proposed in the Section 404 permit application.

Analysis

The PA will directly impact 114 acres of wetlands, 699 acres of upland wildlife habitat, and indirectly impact a much larger area of wetlands and uplands. Portions of the area that will be impacted lie within the 100-year floodplain of the Great Salt Lake. The Great Salt Lake and its surrounding wetlands have been designated a Hemispheric Reserve in the Western Hemisphere Shorebird Reserve Network, testimony to their international importance to a wide variety of migratory waterbirds. Portions of the area that will be impacted also lie within the Davis

County Wetlands Conservation Zone, and also include areas that have been designated by the Utah Division of Wildlife Resources (UDWR) as essential habitat for waterbirds when lake levels are high and more westerly wetlands are flooded. Given that the wetlands which will be impacted comprise part of an area that has been recognized for its international importance to wildlife, and given the magnitude of the impacts associated with this project, analysis of impacts to wetlands and wildlife that makes use of the best available scientific information and methods is necessary.

Comments on the Administrative Draft EIS (July 16, 1998) and Draft EIS (November 16, 1998), identified concerns with the assessment of impacts, including shortcomings in the hydrogeomorphic (HGM) model used to assess wetland impacts, the absence of any formal analysis of impacts to wildlife, and the failure to address indirect impacts. The analysis presented in the Final EIS remains significantly flawed. The HGM model explicitly excludes most wildlife, and no other formal analysis of impacts to wildlife was conducted. The original developers of the HGM approach have stated that "if intensive studies of wildlife and animal communities are needed and justified, the more time-consuming Habitat Evaluation Procedure (HEP) should be used" (Brinson et al. 1995). UDWR recommended that the Utah Department of Transportation (UDOT) conduct a HEP analysis following the biological assessment of the Legacy Parkway study area to UDOT in April of 1997. The Fish and Wildlife Coordination Act provides that wildlife conservation shall receive equal consideration in the Section 404 review process, and therefore equivalent effort in terms of using the best available scientific information and methodologies to assess wildlife impacts was warranted for this project. The Final EIS does include an assessment of indirect impacts to certain wetland functions (generated using the Legacy Parkway HGM model). However, UDWR believes the HGM model to be flawed both in concept and application. Given the shortcomings of analysis, it is not clear whether the proposed mitigation adequately compensates for the unavoidable impacts of the project.

Concerns with the Legacy Parkway HGM model include aspects of the model and its application as well as the process of model development. Major concerns include (1) inadequacies in the modeling of wetland functions; (2) use of a calibration procedure that biases model output; (3) lack of validation and testing of the model; (4) inadequate peer review of the model; (5) numerous problems and errors in the application of the model; (6) failure to address unique aspects of the Great Salt Lake ecosystem; and (7) problems with documentation of HGM methodology in the Final EIS. There is also concern that the problems and errors involved in the application of the model can be detected only by carefully reviewing the massive data set generated with the model, thus effectively obscuring them from scrutiny by decision makers and citizens who focus only on the figures presented in the Final EIS. UDWR began a preliminary review of modeling results in December of 1999, when UDOT first made a dataset available. Because the results changed considerably between December and the Final EIS, a

review of the final dataset is underway. Because of the massive size of the dataset and the time required for analysis, it has been possible to look closely only at Functions 4 and 5 and only at a sample of wetlands. However, many of the problems discovered are systematic and thus could apply to the entire dataset.

(1) Inadequacies in the modeling of wetland functions: The HGM approach to assessing wetland functions is a rapid assessment methodology intended for use in the context of the Section 404 regulatory program where rapid assessments of wetland function requiring from a few hours to a day to conduct are desired as part of the permitting process. Because HGM is a rapid assessment methodology, it typically relies on indicators rather than direct measurements of wetland functioning. For example, if the function of interest was removal of elements and compounds, rather than directly measuring the quantity of elements removed or sequestered by a wetland over a period of time, the HGM approach would evaluate easily observed or measured indicators of a wetland's ability to remove elements, such as soil clay and organic matter content (Ainslie et al. 1999). This is a reasonable approach for a rapid assessment methodology, but it does depend on the careful selection of indicators. Typically, development of HGM models involves substantial field work during which data are collected on a number of potential indicators from wetlands which encompass the known range of variation of a particular wetland class, including both natural and anthropogenic variation (Smith et al. 1995; Brinson and Rheinhardt 1996). The desired approach is to identify measurable ecological attributes that are good indicators of wetland function and that are sensitive to disturbance, so that a highly-impacted wetland will have a very different score from one with few or no impacts.

A significant shortcoming of the HGM model developed for the Legacy Parkway project is that the Assessment Team ("A Team") which developed the model skipped entirely the process of identifying and collecting field data on measurable ecological attributes, and instead chose to use the extent of anthropogenic modification of land in and around the wetland as the primary indicator of wetland functioning. The Legacy Parkway HGM model defines the relationship between the degree of anthropogenic modification and wetland functioning by using a series of indices adopted from a draft HGM model for Florida wetlands (Trott et al. 1997). The indices assign scores to major land-use categories (e.g., industrial, commercial, residential, high-traffic highway, grazing, etc.) according to the degree of anthropogenic modification of each land-use category. According to staff at the U.S. Army Corps of Engineers' Waterways Experiment Station (WES), who are responsible for overseeing the development of HGM models nationally, the Florida model was flawed in its over-reliance on anthropogenic modification rather than measurable ecological attributes to assess wetland function, and the model is currently being revised. Furthermore, the use of indices from the Florida model in the Legacy Parkway model rests on the untested assumption that the indices developed for Florida apply to the Legacy Parkway study area with its very different soils, climate, and vegetation. UDOT's

HGM consultant currently is conducting research for a master's degree which will investigate whether the Florida indices also hold for the Legacy Parkway study area. This research should have been conducted before the Legacy Parkway model was used for assessment of wetland functioning for Section 404 permitting purposes, not after.

While it is reasonable to expect correlation between the level of wetland functioning and the extent of modification of land in and around a wetland, the way land-use categories are used and scored in the Legacy HGM model does not provide the type of data needed to adequately assess functioning for the purposes of the Section 404 program, as can be illustrated with the following example. One variable included in the model, Vadjhab, is supposedly an indicator of the habitat value of land within 1000' of a wetland's perimeter. Different land uses are scored on a scale of 0 to 1.0, with 1.0 assigned to the land-use category assumed to have the highest habitat value. The land use assigned a score of 1.0 is range. According to the original developers of the HGM approach, a score of 1.0 represents "the highest level of sustainable functioning" (Smith et al. 1995). Once enhancement measures such as removing grazing and roads are completed for the Legacy Nature Preserve (LNP), the majority of the land within the LNP will be classified as range, and will receive a score of 1.0. However, the land-use categories used in the Legacy Parkway HGM model tell us nothing specific about the actual condition of the land. Land with a grazing history may have compacted soils, reduced vegetative coverage, and vegetative communities with altered species richness and diversity. These conditions are unlikely to be immediately restored upon the completion of enhancement activities, yet this is what the scores in the Legacy model indicate.

Because a score of 1.0 is awarded without addressing the time required for full restoration of the mitigation area, there is no accounting for the wetland functions lost between the time of permitted impacts and the achievement of fully restored conditions. It is also unclear whether fully restored conditions consistent with "the highest level of sustainable functioning" would be achieved within the mitigation area without additional interventions such as removing exotic vegetation and reseeding with native species. If this is the case, post-implementation conditions should not receive a score of 1.0. A better model would include measurable ecological attributes such as soil and vegetative characteristics that would provide more sensitive indicators of function and allow impacts and the progress of mitigation to be more adequately assessed.

An additional problem with the HGM model's use of land-use modification as the indicator of wetland functioning is that spatial and distance relationships are ignored, an unjustifiable oversimplification. For example, again using the variable Vadjhab, a wetland whose adjacent land use is comprised of 75% range and 25% multi-family residential would receive the same score regardless of the spatial distribution of those land uses. However, the habitat value of a wetland surrounded by housing is less than that of one surrounded by natural habitat. The A

Team chose to assess land uses and barriers only within 1000' of a wetland's perimeter, justifying this choice with the statement that "most of the species that are impacted by adjacent habitats fulfill most of their life cycles within 300 meters (1,000 feet) of the wetland perimeter..." (Final EIS, Section 3.12.5). Even if this statement were true, the A Team has confused the spatial use of individual organisms with the spatial use of species populations, which is the real variable of interest. Important population processes such as dispersal, gene flow, and metapopulation dynamics occur over much larger areas, and can be impacted by changes in land that occur in those larger areas. We believe that the selection of 1,000' as the distance over which to assess land use was an arbitrary decision, and should have been identified as such.

The variable Vbarrier is supposedly one indicator of habitat fragmentation, connectivity, and patchiness. DWR has been unable to get a clear explanation of how this variable is quantified for individual wetlands. Scores for this variable are assigned according to the proportion of a wetland's perimeter believed to be impacted by barriers classified as large (e.g., four-lane highway such as the Legacy Parkway), medium (e.g., paved two-lane road), or small (e.g., dirt road). Given the limited predictive power of even commonly used indices of habitat pattern (Schumaker 1996), and the absence of independent measures to verify the relationship between Vbarrier and ecological processes, questions on the meaningfulness of the numbers generated for this variable arise. The Vbarrier scores for a few wetlands have been reviewed, and many of the scores make no sense. For example, the existing-condition Vbarrier score for wetland BD-WM-181A is 40% large. Post construction, the score is 25% large and 40% small. Since the highway is classified as a large barrier, why would the score for large decrease? Why is there a post-construction score for small barriers, since the only change is construction of the highway, a large barrier? Wetlands BD-WM-227 and 227A both have existing-condition Vbarrier scores of 25% large and 40% small. Post construction scores are 50% large, 30% medium, and 10% small. Why is there a post-construction score for medium barriers? It is difficult to get a clear explanation of how the variable Vmod is quantified for individual wetlands. Vmod is supposedly an indicator of the extent of hydrological modification of a wetland by structures such as dikes and ditches. Understanding exactly how this variable is quantified is important since it is one of two variables in Function 1, the hydrology function of the Legacy Parkway HGM model. Quantification of this variable appears to be highly subjective. During a meeting with UDOT, the Corps, and the resource agencies in June of 1999, how Vmod was being quantified was discussed. The Corps and UDOT's HGM consultant were to clarify this.

The use of land-use modification as the basis for assigning the scores for so many variables results in a significant level of correlation and redundancy among the different functions in the Legacy Parkway model. Functions 4 and 5 are especially redundant, since Function 5 contains both the variables in Function 4. Function 4 could be eliminated.

(2) Use of a calibration procedure that biases model output: A key feature of the HGM approach is the use of reference wetlands to standardize comparisons among wetlands. The accepted procedure is to collect data on indicators from a set of reference wetlands which encompass the known range of variation of a particular wetland type, including both natural and anthropogenic variation. Wetlands which have the highest sustainable levels of functioning across all functions performed by wetlands of a particular type are defined as reference standards, against which the functioning of other wetlands of that type is compared. By definition, reference standards are assigned a score of 1.0 for each variable. Other wetlands are assigned scores between 0 and 1.0 depending on how similar their condition is to that of the reference standards. The use of reference wetlands and the assigning of variable scores relative to reference standards is known as calibration, and may employ a number of techniques, ranging from best professional judgement to multivariate analysis (Smith et al. 1995).

The Legacy Parkway model employs an unusual calibration procedure that biases model output, and the Final EIS does not provide any rationale or justification for the use of this particular procedure. Staff at the WES are not aware of any other model that employs such a procedure. Because the indices used to develop composite scores (sum of the proportion area in each land use times the score for that land use) for some variables such as Vadjhab are already normalized, ranging from 0 for highly modified land uses to 1.0 for unmodified areas, it is not at all clear why any further manipulations were performed on the composite scores. In fact, another HGM model uses normalized indices to score several land-use based variables (Hauer et al. 1999) simply uses the composite scores directly, with no further manipulations (Brad Cook, personal communication).

The process the Legacy Parkway A Team used to calibrate model variables is described in Section B2.1.2 of the Final EIS. Based on the description in this section and review of information in the Legacy Parkway HGM Technical Report, the original composite scores appear to have been adjusted twice. The first adjustment created a “raw number” score from the composite score. There is no explanation of this step in the Final EIS. The second adjustment involved the process described in Section B2.1.2. This step used the standard deviation of the distribution of all scores for a given variable (such as Vadjhab) for a given wetland class (such as depressional) to assign new scores. There are two problems with this procedure. First, the standard deviation of a set of scores is a statistical property whose magnitude is sensitive to the distribution of scores around their mean value. Two sets of scores which span the same range of variation but have a different distribution of scores within that range could have different standard deviations, and thus generate different calibrated scores for wetlands which really have the same level of functional capacity relative to the reference standard. Secondly, this procedure transforms a continuous distribution in which scores can

take on any value from 0.00 to 1.00 to a set of discrete categories. In the case of Vadjhab for depressional wetlands, the possible scores for the discrete categories are 0.1, 0.25, 0.5, and 1.0. Any raw scores between 0.77 and 1.0 were assigned a new score of 1.0, raw scores originally between 0.54 and 0.76 were assigned a score of 0.5, and so on.

By transforming a continuous distribution to a limited number of discrete categories, sensitivity of model output to changes in variables is decreased. For example, a depressional wetland whose existing land use consists entirely of "irrigated pasture rotational grazing" (iprg) would receive a composite score of 0.7, but a calibrated score of 1.0, the score also assigned to the reference standard. Thus the model would be unable to detect any improvement resulting from restoration activities since the highest possible score is already assigned to existing conditions. The original developers of the HGM approach pointed out that the most obvious misuse of the approach would be to accept reference standards from sites that are degraded (Brinson and Rheinhardt 1996) and that is exactly what the developers of the Legacy Parkway HGM model appear to have done. Assigning reference standard values to wetlands with degraded conditions defies Clean Water Act goals of restoring the physical, chemical, and biological integrity of the nation's waters (Brinson and Rheinhardt 1996). As another example, a depressional wetland whose existing condition is scored as having 5% of its perimeter affected by a small barrier such as a dirt road and which would have an additional 20% of its perimeter affected by the Legacy Parkway post-construction would receive identical calibrated scores of 1.0 for Vbarrier for both existing and post-construction conditions, despite the existence post-construction of a large barrier that is well documented in the literature to have significant habitat impacts (e.g., Reijnen et al. 1996; Findlay and Houlahan 1997; Formann and Alexander 1998; Formann and Deblinger 2000; Trombulak and Frissell 2000). Two wetlands with very similar land uses and almost identical composite scores could also receive radically different calibrated scores. For example, a depressional wetland whose adjacent land use consists of 95% iprg and 5% field crop would receive a composite score of 0.69 and a calibrated score of 0.5 for Vadjhab. The scores for a depressional wetland with 100% iprg would be 0.7 composite and 1.0 calibrated.

The calibration process also results in illogical assignments of scores. A depressional wetland whose adjacent land use consists entirely of iprg receives a score of 1.0 for Vadjhab, while a lacustrine wetland whose adjacent land use also consists entirely of iprg receives a score of 0.5 for Vadjhab. The habitat value of land should not depend on whether it is adjacent to a depressional wetland or a lacustrine wetland. Similarly, although more illogically, a lacustrine wetland whose adjacent habitat consisted of 50% iprg and 50% nursery would receive a calibrated score of 0.1 for Vadjhab. According to the original developers of the HGM approach, a score of 0.1 means no detectable functioning for a variable (Smith et al. 1995). We disagree that adjacent land use that consists of 50% iprg and 50% nursery would have no

detectable habitat function. The problem in this case appears to be that lacustrine wetlands in the study area did not span a range of disturbance that included highly degraded wetlands. Rather than recognizing this limitation, the A Team simply assigned an inappropriately-low calibrated score to the lacustrine wetlands with the lowest composite scores.

The net effect of the calibration process can be illustrated by comparing the functional capacity units (FCUs) calculated using calibrated scores to the FCUs calculated using the original composite scores for Function 4 (Table 1). Compared to the original composite scores, calibration increases the impact FCUs by 13% and the mitigation FCUs by 53%. Because the numbers generated by the calibration process bias the output, the model is suspect.

Table 1. Comparison of FCUs Calculated for Function 4 Using Calibrated Versus Composite Variable Scores

	Function 4 FCUs	
	Using Calibrated Variable Scores	Using Composite Variable Scores
Direct Impacts	52	59
Indirect Impacts	53	34
Total Impacts	105	93
Mitigation (Restoration)	155	103
Mitigation (Preservation)	32	22
Indirect Impacts on Mitig.	8	8
Net Mitigation	179	117

(3) Lack of validation and testing of the model: A very serious problem is that no validation or testing of the model was conducted prior to its use for this project. Validation is an essential component of model development; without it, there is no way of assessing how adequately a model represents the system being modeled, and thus no way to assess the meaningfulness of model output. Based on the response to comments in the Final EIS (Section 2.5, Response to UDWR), it is not clear that the preparers of the EIS understand what validation means. It appears they think validation consists of the Corps' approval of the model. Validation consists of testing a model with data other than that used to develop the model to determine whether the model adequately represents the system being modeled.

(4) Inadequate peer review of the model: On June 20, 1997, a National Action Plan to Implement the HGM Approach was published in the Federal Register. The National Action Plan specifies multiple times that development of HGM models will be an open process, with rigorous peer review at all stages of model development. The UDOT and its consultants did provide periodic briefings on the status of model development, but consistently provided information (which needed to be reviewed before the meetings) to the resource agencies at the last minute, preventing careful and complete review. The UDWR sought a meeting in February of 2000 with UDOT's HGM consultant to better understand how the model was being used, but were informed by UDOT that the Corps did not want the consultant to meet. The response to comments in the Final EIS (Section 2.5, Response to UDWR) states that many of UDWR's concerns with the models have been resolved. Some of the original concerns have been addressed. However, as this letter attests, significant concerns have not been addressed. The National Action Plan also specifies that experts at the WES will oversee the development of HGM models to ensure consistency and accuracy, but when contacted, officials at the WES in February of 2000, said the Legacy HGM model had not been provided to them for review.

(5) Numerous problems and errors in the application of the model: Another serious issue is that many problems and errors exist in the application of the model. Because the data tables are massive, only some of the numbers for Functions 4 and 5 were examined. However, some of the problems discovered are systematic, and could also apply to the other functions. The problems are as follows:

(*A) Incorrect calculation of indirect impacts for some wetlands:* The area of wetland within the Legacy Parkway's 100-meter right of way (ROW) was not subtracted from the existing wetland acreage when indirect impacts were calculated. It makes no sense to calculate indirect impacts on wetland acreage that no longer exists. For wetlands where only a portion of the wetland lies within 1000' of the highway, the post-construction scores for variables such as Vadjhab appear to be for the entire wetland, yet only the wetland acreage within 1000' feet of the highway was included in the calculations. If the variable scores are for the entire wetland, then they need to be applied to the entire wetland area, not just the area within 1000' feet of the highway.

(B) Incorrect calculation of restoration credits for some wetlands: Some of the wetlands in the LNP will have the ROW and other areas outside the LNP within 1000' feet of their perimeter. This area will not be improved as part of the mitigation in the LNP, yet the variable scores used to calculate mitigation credits show the entire area being improved. Thus restoration credits have been calculated for areas where no mitigation will actually occur. This would affect all variables where land use within 1000' of a wetland's perimeter is used to assign the score for that variable, including Vmod, Vrunoff, Vdisload, Vsusload, Vadjhab, and Vbarrier.

Numerous other problems exist with the calculation of mitigation credits. Wetland BD-P-A125 is shown as being included in the mitigation area, but it is actually south of the LNP and is totally obliterated by the ROW. Wetland LS-2A is included, but it is north of the LNP, near Farmington Bay. Several wetlands that appear in the aerial photographs in Appendix B1 of the Final EIS as being part of the LNP are not included in the mitigation calculations. These wetlands include BD-MA-M6, BD-P-A95, BD-WM-M1, BD-P-M16, and BD-P-M26. Post-implementation scores for some wetlands that are near structures that will still exist after mitigation takes place, such as the sewage treatment plant on Center Street, do not show these structures in their post-mitigation scores for certain variables, e.g. Vadjhab for BD-P-A115, A116, and A117, and Vbarrier for BD 35, BD 37, BD 38, BD-P-A122, and BD-WM-218. Figure B3-5 shows that the dirt road between Center Street and 900 N will remain post-implementation, yet the HGM calculations show it as being removed. One or the other is incorrect. Wetlands BD-WM-202 and 203 are within 1000' feet of a dirt road north of the LNP, but dirt road is not included among the adjacent land uses for either wetland, either for existing or post-mitigation conditions.

(C) Incorrect calculation of preservation credits for some wetlands: Preservation FCUs for the LNP are calculated as the difference between existing conditions and predicted year 2020 conditions, when all developable uplands are assumed to be developed, divided by 2 to allow for the time required to reach full build out. Some wetlands in the LNP have area within 1000' of their perimeter that is outside the LNP. This area will not be preserved, yet the calculations for preservation credits show the difference between existing conditions and predicted 2020 conditions for this area contributing to the overall preservation credits. This would affect all variables where land use within 1000' of a wetland's perimeter is used to assign the score for that variable, including Vmod, Vrunoff, Vdisload, Vsusload, Vadjhab, and Vbarrier.

Calculation of preservation credits also assumes a worst-case scenario for the area, in that all developable uplands are assumed to be developed with no direct impacts to wetlands. A more likely scenario would include some direct impacts to wetlands which would require mitigation, thus replacing the existing functional values of at least some wetlands.

(D) Incorrect calculation of indirect impacts on mitigation: The same problem mentioned for overall indirect impacts (failure to subtract out acreage impacted by the ROW) also exists for indirect impacts on mitigation. Wetland LS-2A is shown as having indirect impacts (on 116 acres) but it is near Farmington Bay, not in the LNP. Wetland S-11 is shown as having indirect impacts on 40.49 acres, but all other mitigation calculations show only 35.98 acres of this wetland being included in the LNP.

> Wetland BD-OW-18 is within 1000' of the ROW, but no indirect impacts are shown for it. Indirect impacts are calculated for wetland BD-WM-234, but it is not within 1000' of the ROW.

Given the problems with the calculations, it is unclear to what extent the overall tally of impact and mitigation FCUs is affected. Regardless of the overall magnitude of these errors, their existence throws into question the final output. Problems of this sort should not have escaped the scrutiny of adequate quality-control procedures.

(6) Failure to address unique aspects of the Great Salt Lake ecosystem: Although all wetlands experience changing conditions over time, the wetlands surrounding the Great Salt Lake are different from most wetlands for which HGM models have been developed because changing lake elevations can cause substantial changes in wetland functions over relatively short time periods. The resource agencies have repeatedly expressed to UDOT and the Corps our concern that the HGM model fails to account for the temporal dynamics of the Great Salt Lake ecosystem, in particular the importance of wetlands at higher elevations as refugia when lake levels are high. The Corps has responded that these temporal dynamics are beyond the scope of HGM, but that best professional judgement would be applied to "red flag" certain areas that might be considered for higher mitigation ratios.

On December 16, 1999, during a meeting of the UDOT, the Corps, and the resource agencies, the UDWR provided maps of areas in the Legacy Parkway study area used by waterbirds when lake levels were high during the 1980s, and also provided data from waterbird surveys currently being conducted by UDWR. At that time the Corps stated that they would review the maps and data and then schedule a meeting with the resource agencies to discuss how the data could be used. Despite additional requests (on January 20, 2000 and April 3, 2000) from the U.S. Fish and Wildlife Service to schedule a meeting, no meeting has ever been held. In its response to the Fish and Wildlife Service's second request to schedule a meeting, the Corps also dismissed UDWR's data as "too general to be of much use." Since the Legacy Parkway HGM model is based on indices developed for a Florida HGM model, it is unclear how data specific to the Legacy Parkway study area can be "too general to be of much use." The Final EIS states (in Section B2.1.2) that the HGM models "will be supplemented by the best professional judgement of the COE personnel, resource agency representatives, UDOT staff, and UDOT's consultants to determine whether the proposed mitigation adequately compensates for impacts from the Legacy Parkway." Such discussions should have occurred prior to the publication of the Final EIS, and the resource agencies repeatedly sought this.

(7) Problems with documentation of HGM methodology in the Final EIS: The description of HGM methodology and the Legacy Parkway model in the Final EIS to be poorly written, in that a layperson unfamiliar with the methodology would have a difficult time understanding

exactly what the method involves, as well as the simplifications and assumptions upon which the method is based.

If a decision as to the adequacy of mitigation is to be based on formal analysis of impacts and mitigation, then the HGM model needs to be revised or some other method for wetlands assessment utilized, and a HEP analysis should be conducted for wildlife. The alternative is to use best professional judgement to assess the adequacy of mitigation, which would involve considering factors such as the uniqueness and temporal dynamics of the Great Salt Lake ecosystem, its international importance to wildlife, development threats, and the importance of creating a buffer zone west of the highway. If this latter alternative is pursued, then the decision-making process should be a public process involving the resource agencies and affected interests.

Mitigation

When the conceptual mitigation plan was presented to UDWR and other entities for review, concern was expressed about the lack of connection between the mitigation plan and the use of HGM to quantify impacts and mitigation credits. Because one purpose of mitigation is to provide compensation for unavoidable impacts to wetland function, the appropriate sequence would be to first assess impacts and then design mitigation to compensate for those impacts. However, the mitigation plan for the Legacy Parkway was developed before the HGM model was finalized. And while the Final EIS states that the Legacy Nature Preserve (LNP) will be managed for wildlife, the HGM model does not apply to most wildlife species. Rather than being used to identify mitigation needs, model results were instead used to justify the mitigation plan. While we believe that the LNP will have wildlife value, and commend UDOT for proposing 317 acres of additional mitigation as compensation for impacts to wildlife not addressed by the HGM model, the lack of analysis makes it impossible to determine whether the proposed mitigation is adequate.

Because the mitigation measures chosen for the Legacy Parkway project consist of preservation and enhancement of existing wetlands, a net loss of 114 acres of wetland will occur. Enhanced habitat quality does not necessarily compensate for lost habitat area. Portions of the proposed mitigation area were flooded during the 1980s, and the mitigation value of these areas will be temporarily lost in the future during times when lake levels are high. Section 4.13.4 of the Final EIS states that the placement of equalization culverts under the roadway to allow the passage of water will provide for wildlife habitat east of the highway in high-water years. It is unlikely that flooding will be allowed east of the highway once that area has been developed.

Section B3.3.5.4 of the Final EIS states that mitigation provided by the proposed Legacy Nature Preserve will be sufficient to compensate for impacts to all wetland functions except for Function 5 (Habitat Connectivity, Fragmentation, and Patchiness). UDWR believes this statement is based on numbers UDOT provided in December of 1999. However, the results presented in Figure B3-9 and the tables in Section 4.12 of the Final EIS show that the proposed mitigation will not be sufficient to compensate for impacts to Function 1, Surface Water Storage, and Function 2, Removal of Dissolved Elements and Compounds. For Function 1, there are 157 FCUs of impacts but only 108 FCUs of mitigation (actually 113 FCUs since Figure B3-9 appears to have mistakenly used the indirect impacts on mitigation of Alternative A rather than the PA; this same mistake appears in Table 4-23). Thus the proposed mitigation would compensate for only about 70% of the impacts to hydrology, the most important factor in wetland formation and function. However, given the flaws in the HGM model noted previously, it is not possible to use model results to assess whether the mitigation adequately compensates for impacts.

In Section B3.1.4.2, the Final EIS states "the models would be supplemented by the best professional judgement of the COE resource agency representatives, UDOT, and its consultants to determine whether the proposed mitigation adequately compensates for impacts from the Legacy Parkway." We assume the lack of a comma between COE and resource is a typo. UDWR looks forward to being involved in a discussion of the adequacy of the proposed mitigation. Factors not included in the HGM model, such as the international importance of the Great Salt Lake ecosystem, the temporal dynamics of the system, development threats, and perceived value of creating a buffer area between the Legacy Parkway and wetlands to the west should be considered in determining the overall adequacy of mitigation. A final decision as to the adequacy of mitigation will be a value decision, and should be recognized as such. Finally, because of the insensitivity of variables in the HGM model to changes in condition of the mitigation area expected as a result of enhancement activities, variables should be identified for which quantifiable measures are possible, and that quantitative mitigation goals be established. The mitigation plan should specify corrective measures that will be taken, and when they will be triggered, if mitigation goals are not achieved.

Section 4.13.3 of the FEIS states that landscaping of the ROW would provide mitigation for impacts to mammals. The adverse impacts of roads on animal populations are well-documented. Landscaping of the ROW is being done for purposes other than providing mitigation for mammals, may attract mammals to areas of higher mortality, and should not be considered mitigation.

Section B3.1.3 of the Final EIS states that use of the 317 acres of additional mitigation will be for preservation only. The UDOT plans to transfer ownership of the property to the Utah Department of Natural Resources (UDNR), to be managed as part of Farmington Bay Waterfowl Management Area (FBWMA). Since the land will be managed as part of

FBWMA, some use for hunting and wildlife observation may occur.

Section B3.5.1 lists Cecile LeBlanc of UDWR as a member of the HGM technical team for the Legacy Parkway HGM model. Ms. LeBlanc was involved in early discussions of the HGM model. However, she resigned from UDWR in May of 1998, and since that time there has been no representative from UDWR on the Legacy Parkway HGM technical team.

Monitoring

The Final EIS dismisses many potential impacts from the PA, including impacts to hydrology and water quality. It would be appropriate to institute a comprehensive monitoring program for functions and variables of concern. If impacts do occur, then additional mitigation would be required. UDWR recommends that the Corps and UDOT coordinate with the resource agencies to identify variables of concern and to discuss the design of an acceptable monitoring program. The baseline monitoring of wildlife usage of the LNP may have been inadequate. Baseline monitoring was conducted only from March of 1999 to February of 2000. However, data gathered by UDWR's waterbird monitoring program indicates that bird numbers can vary dramatically from year to year. The number of peep sandpipers counted during UDWR's waterbird survey period 10 in 1999 was about 10,000, compared to a 3-year mean of about 70,000 for that survey period. The number of eared grebes counted during UDWR's waterbird survey period 14 in 1999 was about 25,000, compared to a 3-year mean of about 250,000 for that survey period. Monitoring for only 5 years post-implementation may be inadequate. Research indicates that the full effects of highway construction on biodiversity may not be detected in some taxa for decades (Findlay and Bourdages 2000).

Governor's Office of Planning and Budget

Benefits of the Hydrogeomorphic Methodology

The Hydrogeomorphic or HGM approach is based on the recognition of common hydrological and geomorphic characteristics of different types of wetland systems and the subsequent use of reference wetland systems as the basis for scaling functional attributes. Hydrogeomorphic properties are the primary drivers of wetland functions where functions are defined as the processes that are necessary for the self maintenance of an ecosystem, such as primary production, nutrient cycling and decomposition. Because the core properties differ in quantity and quality among the classes of wetlands, functions and levels of functions also differ among wetland classes. The HGM functional assessment recognizes three broad classes of wetland functions: hydrological, biogeochemical and habitat. These broad classes of function can be

subdivided into more specific wetland functions. Reference wetland sites are chosen to establish the range of variability within a region for a hydrogeomorphic subclass of wetlands and thereby establish a regional standard of comparison of functions . The reference domain includes wetlands that range from disturbed to relatively undisturbed wetlands (reference sites). This defines the variability of the indicators and variables used in the assessment models within a subclass. Reference standards for a wetland subclass, however, are based on the characteristics of a subset of reference wetlands that is restricted to the best of the subclass (the least impacted) and encompass the variation that occurs in this subset. Wetlands in that subset are compared to the reference standard to gage their level of performing that function. The method does not assign societal value to the functions.

This approach:

Acknowledges that not all wetlands perform the same functions. A playa does not have a groundwater recharge function. Not all wetlands perform a function at the same level. It does not compare one wetland class or subclass to another class or subclass.

It looks at all functions performed by a subclass not just habitat for specific wildlife species. A wetland could be "enhanced" for waterfowl production but that would drive all of the other functions downward. Good habitat for a particular species does not indicate that a wetland is performing well in its biogeochemical or hydrologic functions.

It uses wetland subclasses from the local region to establish the natural range of variation within a subclass. By narrowing the range of natural variation (while acknowledging that this natural variation exists), it will ultimately be easier to detect variations that are caused by human impacts.

Reference standard wetlands within subclasses provide data on what level of functioning can be expected if human impacts are imposed or removed from a site.

The assessment method allows us to look beyond the jurisdictional boundaries of the wetland to be filled. The adjacent habitat and land uses are incorporated into the wetland functional assessment (in this model 1000 feet around the wetland).

This method allows for measuring impacts function by function rather than only acre by acre. It can specify a loss of a certain amount of the hydrology functions over an area. Mitigation that addresses the specific loss of function could then be required.

It is designed and implemented by multi disciplinary teams not by teams of biologists as other models such as HEP depend. Nor does it require the user to predict future

conditions.

In conclusion, the HGM model is an effective and efficient use of science to evaluate the impacts of the Legacy Parkway.

The Committee appreciates the opportunity to review this proposal. Please direct any other written questions regarding this correspondence to the Utah State Clearinghouse at the above address or call Carolyn Wright at (801) 538-1535 or John Harja at (801) 538-1559.

Sincerely,

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State Planning Coordinator

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